



Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

0050442

066040

FEB 8 1999

Mr. Douglas R. Sherwood
Hanford Project Manager
U.S. Environmental Protection Agency
712 Swift Boulevard, Suite 5
Richland, Washington 99352-0539

Dear Mr. Sherwood:

STABILIZATION PLAN FOR 300 AREA LEAD CONTAMINATED SOIL, RFS-ERDF-007,
REV. 0

In order to dispose of the 42 containers received from the 300 Areas that contain lead contaminated soils, treatment will be required to stabilize the leachable lead. Attached is the subject document for U.S. Environmental Protection Agency (EPA) review and approval. This plan was developed based on discussions between EPA and the U.S. Department of Energy, Richland Operations Office (RL), and reflects all comments coming out of those informal discussions. Mobilization and preparatory activities are currently being initiated and treatment could start as soon as March 1, 1999. Approval is requested from EPA by February 26, 1999.

In order to expedite the process, RL has provided an approval signature block below. Upon receipt of EPA approval, treatment of the lead contaminated soils will commence.

If you want to discuss this matter further or require additional information, please contact me at 373-6295.

Sincerely,

Owen C. Robertson, Senior Project Manager
Remedial Actions Project

RAP:OCR

Attachment

cc w/attach:
D. R. Einan, EPA
P. S. Innis, EPA

cc w/o attach:
V. R. Dronen, BHI
G. B. Mitchem, BHI

Approval: _____





RFS-ERDF- 007

Rev. 0

RECEIVED

JAN 15 1999

BY DIS**Environmental Restoration
Disposal Facility***Waste Disposal Operations***Stabilization Plan
for 300 Area Lead
Contaminated Soil**

| BECHTEL HANFORD, INC. | | | | | | | | | | JOB NO. 22192 | | | | | | | | | |
|--|--|--------------|--|-------|--|-----------|--|---------|--|---------------|--|--------|--|---------|--|------|--|--------|--|
| SUBCONTRACTOR/SUPPLIER DOCUMENT STATUS STAMP | | | | | | | | | | | | | | | | | | | |
| 1. <input checked="" type="checkbox"/> Work may proceed. | | | | | | | | | | | | | | | | | | | |
| 2. <input type="checkbox"/> Submit final document. Work may proceed. | | | | | | | | | | | | | | | | | | | |
| 3. <input type="checkbox"/> Revise and resubmit. Work may proceed subject to resolution of indicated comments. | | | | | | | | | | | | | | | | | | | |
| 4. <input type="checkbox"/> Revise and resubmit. Work may not proceed. | | | | | | | | | | | | | | | | | | | |
| 5. <input type="checkbox"/> Permission to proceed not required. | | | | | | | | | | | | | | | | | | | |
| Permission to proceed does not constitute acceptance or approval of design details, calculations, analyses, test methods, or materials developed or selected by the subcontractor/supplier, and does not relieve subcontractor/supplier from full compliance with contractual obligations of release and "holds" placed on the contract. | | | | | | | | | | | | | | | | | | | |
| DESIGN/ENGINEERING | | | | | | | | | | | | | | | | | | | |
| C/S/A | | ELE. | | MECH. | | PIPE-LINE | | CONTROL | | CEM. | | SAFETY | | NUCLEAR | | ENV. | | SAFETY | |
| | | | | | | | | | | | | | | | | PLAN | | HEALTH | |
| UNLESS REVIEW | | | | | | | | | | | | | | | | | | | |
| REVIEWED BY | | | | | | | | | | | | | | | | | | | |
| BY | | DATE 1/17/99 | | | | | | | | | | | | | | | | | |

Work Performed for
Bechtel Hanford Inc.
Under Subcontract
0600X-SC-G0006

**Waste Management
Federal Services, Inc.**

0600X-SC-G0006-5-018-01A

[illegible]

List of Effective Pages

| <u>Page Number</u> | <u>Revision/PCN Number</u> | <u>Revision/PCN Date</u> |
|--------------------|----------------------------|--------------------------|
| Pages i through iv | Rev. 0 | October 1, 1998 |
| Page 1 | Rev. 0 | October 1, 1998 |
| Page 2 | Rev. 0 | October 1, 1998 |
| Page 3 | Rev. 0 | October 1, 1998 |
| Page 4 | Rev. 0 | October 1, 1998 |
| Page 5 | Rev. 0 | October 1, 1998 |
| Page 6 | Rev. 0 | October 1, 1998 |
| Page 7 | Rev. 0 | October 1, 1998 |
| Page 8 | Rev. 0 | October 1, 1998 |

Table of Contents

| | |
|--|------------|
| List of Effective Pages..... | iii |
| 1.0 Background | 1 |
| 2.0 Purpose..... | 1 |
| 3.0 Scope..... | 2 |
| 4.0 Bench Scale Stabilization Tests | 2 |
| 4.1 Representative Sample | |
| 4.2 Baseline Sample | |
| 4.3 Bench Scale Stabilization Tests | |
| 4.4 Evaluation of Test Results | |
| 5.0 Stabilization of the 42 Containers of 300 Area Contaminated Media | 3 |
| 5.1 Equipment & Supplies | |
| 5.2 Mobilization | |
| 5.3 Stabilization Process | |
| 5.4 Sampling | |
| 5.5 Spill Response | |
| 5.6 Breakdown | |
| Attachment 1 | 6 |
| Attachment 2 | 7 |
| Attachment 3 | 8 |

1.0 Background

Bechtel Hanford, Inc. (BHI) is the Environmental Remediation Contractor (ERC) for the Department of Energy – Richland Operations (DOE-RL) at the Hanford Site. As the ERC, BHI is responsible for performing site investigations, characterization, remediation and restoration of all locations identified as Remedial Action Sites at Hanford. During the remediation phase of an abandoned burial ground in the 300 Area Remedial Action Site, it was determined that the soil loaded in 42 roll-off containers was regulated as a hazardous waste due to elevated levels of lead. Attachment 1 is a compilation of the analytical results from the sampling activities of the soil, and Attachment 2 is the waste designation of the soil. These containers are currently staged at the Environmental Restoration Disposal Facility (ERDF) in the 600 Area.

This material is restricted from land disposal based upon the waste designation (Attachment 2) of the material. The soil must therefore be treated to meet the ERDF waste acceptance criteria and the Land Disposal Restriction for lead utilizing a treatment technology identified in 40 CFR 268.42. A visual inspection of the waste in the boxes indicates the waste is both media and debris because it contains both soil (media) and rocks (debris). Debris is identified as “any solid material exceeding a 60mm particle size that is intended for disposal and that is: a manufactured object; or plant or animal matter; or natural geologic material”. Stabilization is the identified treatment technology for contaminated media per 40 CFR 268.42, whereas microencapsulation is the alternative treatment standard for hazardous debris as identified in Table 1- *Alternative Treatment Standards for Hazardous Debris*, of 40 CFR 268.45. Microencapsulation is by definition stabilization and therefore the treatment process is the same.

Stabilization is a treatment technology that reduces the hazard potential of a waste by converting the contaminants into their least soluble, mobile or toxic form. Attachment 3 is a copy of a table from *Chemical Fixation and Solidification of Hazardous Wastes* by Jesse R. Conner. The table shows the stabilization capabilities of cement and fly ash on lead contaminated materials.

2.0 Purpose

There are 42 boxes currently staged at the ERDF that contain soil that is contaminated with lead at levels above regulatory limits. The level for lead in the soil, based upon TCLP analysis results, is approximately 20 mg/l which is 4 times the treatment standard limit. The contaminated soil must be treated prior to disposal. The purpose of this plan is to establish a stabilization mixture for the waste stream and describe the actual process to stabilize the contaminated soil.

3.0 Scope

The scope of this plan is the treatment of the 42 boxes of lead contaminated soil from the 300 Area. The plan covers the bench scale stabilization tests, full-scale treatment process, and potential verification sampling activities.

4.0 Bench Scale Stabilization Tests

4.1 Representative Sample

A composite sample will be collected from container #405 currently staged at ERDF. This has been chosen for the bench scale test because it contains soil with the highest levels of leachable lead based upon results from the January 1998 sampling event. A composite sample will be created by thoroughly mixing material collected from each corner of the container. Approximately 41 pounds or greater of soil will be collected to ensure there is enough material to sample to establish a baseline level of lead contamination for the composite sample and to perform 2 bench scale tests of stabilization agents.

4.2 Baseline Sample

A Toxicity Characteristic Leaching Procedure (Method 1311 of SW-846) analysis and a Total Lead analysis will be performed on the composite sample prior to the addition of any stabilization agent. This will establish the baseline level of total and leachable lead in the soil. The analytical results from the bench scale stabilization tests will be compared to this baseline result to determine how successful the stabilization agents are and whether routine verification sampling will be required during the full-scale stabilization project.

4.3 Bench Scale Stabilization Tests

Twenty pounds of soil from the composite sample will be placed into a mortar tub or similar device and mixed with 1 quart of water (10% by weight). The exact amount of water may vary dependent upon moisture content of the soil. The material will be mixed by hand with a hoe or shovel to simulate the mechanical mixing of the full-scale process (see Section 2.3). The stabilization agent will then be added to the tub and physically mixed with the soil and water. Two stabilization agents will be evaluated during the bench scale tests – Portland cement and fly ash. The Portland cement mixture will be 30% by weight and the fly ash mixture will be 40% by weight. Samples will be taken when the mixtures pass the Paint Filter Test (PFT) and 20 minutes after the mixing is completed. Any unused composite sample material will be bagged and placed back into container #405.

A PFT will be performed on each mixture immediately after finishing the mixing process and every 10 minutes thereafter to determine when the mixture meets the "no free liquids" requirements of the ERDF Waste Acceptance Criteria. This will represent the earliest time at which the mixture could be placed in the landfill. If the passing of the PFT coincides with the 20 minute sampling time, only one sample will be taken for that mixture.

Sample jars containing the proper leaching reagent(s) per Method 1311 of SW-846 will be on hand for the bench scale tests. The samples will be taken from the mixtures and immediately placed into the leaching reagent. This will initiate the leaching process on the mixture and be representative of the earliest point in time when the mixture could be land disposed.

The table below identifies the samples that will be taken. One duplicate sample will be taken. The samples will be shipped to an approved laboratory to be processed according to the Toxicity Characteristic Leaching Procedure (Method 1311 of SW-846). The aliquots will be analyzed for metals according to Method 6010 of SW-846.

Table 1
BENCH SCALE STABILIZATION SAMPLES

| Sample | Stabilization Material | Mix Ratio (SM:W) | Sampling Time |
|--------|------------------------|------------------|---------------|
| 1 | Fly Ash | 0.4:1 | Pass PFT |
| 2 | Fly Ash | 0.4:1 | FM + 20min |
| 3 | Cement | 0.3:1 | Pass PFT |
| 4 | Cement | 0.3:1 | FM + 20min |

SM: stabilization material
W: waste
FM: finish mix time

4.4 Evaluation of Test Results

The bench scale sample results will be evaluated against the 5-mg/l regulatory limit for lead. Any mixture that produces an analytical result of less than 5-mg/l for lead meets the treatment standard and the mixture/time will be considered a success. Any of the successful mixtures can be utilized for the actual treatment of the waste outlined in Section 2 of this plan. Failure of the bench scale test is when analytical results are reported at or above the 5-mg/l limit for lead. If the mixture fails, it can not be used for the treatment of the waste.

5.0 Stabilization of the 42 Containers of 300 Area Contaminated Media

5.1 Equipment & Supplies

- Volvo trucks for shuttling/unloading of roll-off boxes
- Excavator
- D8 or D6 bulldozer
- Crane
- "drag off" waste box
- cement or fly ash

- water supply/totalizer
- guppy for bulk storage of cement/fly ash
- roll-off container for cement/fly ash
- bag house for loading cement/fly ash into guppy and roll off container
- cover for roll-off container with "load in" port and bag house for loading cement/fly ash
- plastic sheets

5.2 Mobilization

- Develop procedures for project
- Place "drag-off" box in the contamination area.
- Build waste and DOC around and partially up the sides of the box.
- Remove steel supports from inside drag-off box and pour 10-12" concrete floor to create the "mix box"
- Create an access and working platform for excavator with waste and DOC.
- Prepare unloading stations at box.
- Fabricate cover for roll-off container
- Stage excavator in ERDF cell.
- Stage guppy trailer and bag house for cement/fly ash alongside ERDF scale
- Install totalizer on water line to be used to add water to mix box
- Perform training of personnel to procedures/equipment

5.3 Stabilization Process

5.3.1 Determining Mixture for Each Container

The truck scale at ERDF was used to determine the weight of contaminated soil in each of the 42 boxes. The amount of stabilizing agent and water to be mixed with the soil will be calculated by multiplying the weight of the waste by the chosen mix ratio. A written log will track the waste treatment process and will include the date, container #, waste weight, stabilization agent weight, and amount of water.

5.3.2 Adding Contents to Mix Box

The integrity of the mix box will be inspected prior to use at project start-up, and before use each day until project closure. The contaminated soil will be shuttled into the ERDF disposal cell and unloaded into a mix box. Water will be added to the waste using a totalizer to ensure the correct addition of water. An excavator will be used to mix the soil with the water. The calculated amount of stabilizing agent will then be added to the box. The excavator will again perform a thorough mixing of the materials. The mixing process will be monitored by the operations supervisor to ensure proper mixing. Signs of incomplete or improper mixing would be dry spots and/or excessive wet spots. In either scenario, further mixing by the excavator would be required. If large debris is found in the soil, it will be removed from the mix box only if it is interfering with the mixing process. Large debris that is removed will be

placed directly into the ERDF disposal cell. If lead debris is encountered, it will be removed from the mix box and staged for treatment by macro-encapsulation at a later date.

5.3.3 Disposal of the Stabilized Soil

After mixing is complete and proper set-up time has elapsed, the excavator will remove the mixture from the box and place it in the landfill. The set-up time will be based upon the time established in the bench-scale tests. The bulldozer will push the stabilized waste away from the treatment area and into the disposal cell.

5.4 Sampling

Due to the relatively low levels of lead contamination in the soil, verification sampling of the stabilized waste is not planned. This section will be updated in a revision to the plan if the bench scale test results indicate a need to perform verification sampling.

5.5 Spill Response

In the event of a spill (loss of material outside of the ERDF cell), Section 14.0, *Spill Response Plan*, of the ERDF Health and Safety Plan (RFS-ERDF-002.1, Rev. 3) will be implemented to initially control the spill. The spill cleanup will be accomplished by using available ERDF heavy equipment to clean up the bulk of the spill, and shovels will be used to complete the cleanup. Radiological controls will be used to protect personnel from any radiological hazards associated with the spill cleanup. Loss of material within the ERDF cell is not considered a spill to the environment, but will be cleaned up in the same manner. In both cases, the material will be placed into a standard roll-off container and continue through the stabilization process.

5.6 Breakdown

- The used mix box will be retrieved and dragged to a location for future use using the excavator and dozers.
- Decontaminate and release the excavator (if not a regulated rig).
- Return guppy and bag house.

ATTACHMENT 1

LANE HILL 1D EXCAVATION - LEAD REF JLTS

| Date | Location | Sample ID | | Field | Sample Results - Pb ^a | | |
|----------|---|-----------|--------|--------|----------------------------------|------------|------|
| | | XRF | QES | Survey | XRF(total) | ICP(total) | TCLP |
| 12/10/97 | ver sample; future ramp area; 13' depth | B0LM89 | | pCi/g | ppm | ppm | ppm |
| 12/31/97 | ver sample; future cont stockpile area | B0MLW6 | | | <100 | | |
| 1/7/98 | N60/E40; visibly clean sample-excavation area; 12' depth | B0MLX3 | | | <100 | | |
| 1/7/98 | N110/E60; visibly clean sample-excavation area; 8' depth | B0MLX6 | | | <100 | | |
| 1/7/98 | N30/E30; visibly clean sample-excavation area; 8' depth | B0MLX7 | | | <100 | | |
| 1/9/98 | process sample; 1st truck on 1/9 | B0MLY6 | | | 240 | | |
| 1/9/98 | N70/E20; visibly clean sample; excavation area; 15' depth | B0MX00 | | | 210 | | |
| 1/9/98 | N10/E40; visibly clean sample; excavation area; 15' depth | B0MX01 | | | <100 | | |
| 1/9/98 | N20/E70; visibly clean sample; excavation area; 15' depth | B0MX02 | | | <100 | | |
| | <i>ERDF box composite</i> | | | | | | |
| 1/9/98 | 771 | B0MX98 | | | 415 | | |
| 1/9/98 | 742 | B0MX99 | | | 291 | | |
| 1/9/98 | 539 | B0MX80 | | | 151 | | |
| 1/9/98 | 161 | B0MXB1 | | | 246 | | |
| 1/9/98 | 169 | B0MXB2 | | | 361 | | |
| 1/9/98 | 1706 | B0MXB3 | | | 228 | | |
| 1/9/98 | 602 | B0MXB4 | | | 412 | | |
| 1/9/98 | 509 | B0MXB5 | | | 119 | | |
| 1/9/98 | 117 | B0MXB6 | | | 270 | | |
| 1/12/98 | 507 | B0MX04 | | | 410 | | |
| 1/12/98 | 755 | B0MX07 | B0MX06 | 46 | 408 | 402 | 3.69 |
| 1/12/98 | 404 | B0MX10 | | | 409 | | |
| 1/12/98 | 343 | B0MX13 | B0MX12 | 38 | 200 | 1240 | 1.16 |
| 1/12/98 | 519 | B0MX16 | | | 320 | | |
| 1/12/98 | 137 | B0MX19 | | | 470 | | |
| 1/12/98 | 423 | B0MX43 | | | 333 | | |
| 1/12/98 | 1705 | B0MX22 | | | 260 | | |
| 1/12/98 | 795 | B0MX31 | B0MX30 | 15 | 295 | 306 | 1.9 |
| 1/12/98 | 324 | B0MX25 | | | 233 | | |
| 1/12/98 | 790 | B0MX28 | | | 201 | | |
| 1/12/98 | 515 | B0MX34 | | | 344 | | |
| 1/12/98 | 405 | B0MX37 | B0MX36 | 28 | 570 | 760 | 19 |
| 1/12/98 | 533 | B0MX46 | | | 162 | | |
| 1/12/98 | 514 | B0MX49 | | | 621 | | |
| 1/12/98 | 353 | B0MX52 | | | 359 | | |
| 1/12/98 | 618 | B0MX55 | B0MX54 | 88 | 694 | 1800 | 1.73 |
| 1/12/98 | 146 | B0MX58 | | | 850 | | |
| 1/12/98 | 139 | B0MX61 | | | 264 | | |
| 1/12/98 | 170 | B0MX64 | | | 254 | | |
| 1/12/98 | 433 | B0MX67 | | | 426 | | |
| 1/12/98 | 1700 | B0MXB7 | | | 579 | | |
| 1/12/98 | 344 | B0MXB8 | | | 282 | | |
| 1/12/98 | 707 | B0MXB9 | | | 400 | | |
| 1/12/98 | 730 | B0MXC0 | | | 605 | | |
| 1/12/98 | 339 | B0MX40 | B0MX39 | 80 | 940 | 921 | 5.41 |
| 1/13/98 | contaminated stockpile within excavation area | B0MX97 | B0MX96 | 75 | 344 | 395 | 18.9 |
| 1/16/98 | SW test pit; 1' (test pit) depth | B0MXD1 | | | 1500 | | |
| 1/16/98 | SW test pit; 2' depth | B0MXD2 | | | 1300 | | |
| 1/16/98 | SW test pit; 3' depth | B0MXD3 | | | 1200 | | |
| 1/16/98 | SW test pit; 4' depth | B0MXD4 | | | 890 | | |
| 1/16/98 | SW test pit; 5' depth | B0MXD5 | | | <100 | | |
| 1/16/98 | SW test pit; 6' depth | B0MXD6 | | | 490 | | |
| 1/16/98 | SW test pit; 7' depth | B0MXD7 | | | <100 | | |
| 1/16/98 | NW test pit; 1' (test pit) depth | B0MXD8 | | | <100 | | |
| 1/16/98 | NW test pit; 2' depth | B0MXD9 | | | 390 | | |
| 1/16/98 | NW test pit; 3' depth | B0MXF0 | | | 940 | | |
| 1/16/98 | NW test pit; 4' depth | B0MXF1 | | | 930 | | |
| 1/16/98 | NW test pit; 5' depth | B0MXF2 | | | 420 | | |
| 1/16/98 | NW test pit; 6' depth | B0MXF3 | | | <100 | | |

ATTACHMENT 2

**Environmental Restoration Disposal Facility
Waste Profile Datasheet**

PROFILE #6184002
REV. 01
PAGE 1 OF 3

1. **PREPARER'S NAME:** Richard Lipinski
 2. **ORGANIZATION NAME:** FSWM *PSL*
 3. **PROJECT ENGINEER:** J. R. James
-

4. Source Waste Site ID: 618-4, Landfill 1A, Landfill 1B, Landfill 1D, and 300-44
5. Waste Forms: 95 % soil % debris % concrete % steel 5 % other
Describe "other": Macroencapsulated lead.
6. Waste Characterized by:
X Process Knowledge
X Sampling: HEIS data
7. a) Does this waste designate as "hazardous" (40CFR Part 261)? X yes no
If yes, what would the appropriate waste codes be? D008

b) Does this waste designate as "dangerous" (WAC 173-303-070 through -100)? X yes no
List chemical constituents on page two.
8. Is this waste radioactive? X yes no
If yes, list radioactive constituents on page two.
9. Is this waste subject to land disposal restrictions (LDRs)? X yes no
If yes, indicate which LDRs apply on page two and attach any applicable information or waivers.
10. Packaging: 95 % bulk % bags 5 % drums or waste boxes
(Note: total for packaging must equal 100%.)
11. Estimated volume of profiled waste from this site: 2200 Yd³ (1650 M³)
12. All information submitted in this and all attached documents contains true and accurate descriptions of the waste. All relevant information regarding known or suspected hazards in the possession of the preparer has been disclosed. I certify that to the best of my knowledge, the information contained within this profile and any attached documentation accurately describes the waste stream and that all shipments of waste transported under this profile meet the ERDF Waste Acceptance Criterion specified in BHI-00139.

13. Concurrence:

J.R. James
R/X or Area Project Engineer

10-1-98
Date

[Signature]
Waste Disposal Operations Subcontractor

10-05-98
Date

14. Approval to ship:

[Signature] for A.R. Michael
ERDF Project Engineer

10/5/98
Date

**Environmental Restoration Disposal Facility
Waste Profile Datasheet**

PROFILE #6184002

REV. 01

PAGE 2 OF 3

ESL

Chemical Profile: List of relevant constituents. See attached analytical results.

NOTE: Waste will not be disposed in excess of the values shown in the following list of relevant constituents.

| CONSTITUENT | CONCENT. | UNITS | NOTES |
|---------------------------------------|----------|-------|--|
| 1,1,2-Trichloro-1,2,2-trifluoroethane | 0.0085 | mg/kg | |
| 1,1-Dichloroethene | 0.32 | mg/kg | |
| 1,2-Dichloroethane | 0.38 | mg/kg | |
| 1,2-Dichloroethene | 0.32 | mg/kg | |
| 2-Methylnaphthalene | 14.000 | mg/kg | |
| 4,4'-DDD | 0.3 | mg/kg | |
| Acetone | 12 | mg/kg | |
| Ammonia | 0.5 | mg/kg | |
| Antimony | 29.9 | mg/kg | |
| Aroclor 1254 | 160 | mg/kg | |
| Aroclor 1260 | 0.22 | mg/kg | |
| Arsenic | 130 | mg/kg | TCLP .148 mg/l |
| Barium | 45.000 | mg/kg | If > 2000 mg/kg, then TCLP must be < 100 mg/l |
| Benzene | 0.34 | mg/kg | |
| Beryllium | 0.82 | mg/kg | |
| Butylbenzylphthalate | 26 | mg/kg | |
| Cadmium | 35.4 | mg/kg | TCLP 0.623 mg/L |
| Carbon Tetrachloride | 0.35 | mg/kg | |
| Chlorobenzene | 0.4 | mg/kg | |
| Chloroform | 0.28 | mg/kg | |
| Chromium | 1.630 | mg/kg | TCLP .207 mg/l |
| Endosulfan I | 0.077 | mg/kg | |
| Ethylbenzene | 21 | mg/kg | |
| Fluoranthene | 0.1 | mg/kg | |
| Isoforone | 31 | mg/kg | |
| Lead | 100 | " | Lead is listed at 100%. Elemental lead will be included in this waste stream that is contaminated with soil containing other constituents listed and then macroencapsulated. |
| Lead | 4.610 | mg/kg | Lead is present in the soil up to 4.610 mg/kg. This will be treated to achieve a TCLP concentration below 5 mg/L. |
| Mercury | 5.9 | mg/kg | TCLP .0022 mg/l |

**Environmental Restoration Disposal Facility
Waste Profile Datasheet**

PROFILE #6184002

REV. 01

PAGE 3 OF 3

PSL

| | | | |
|--------------------|-------|-------|---|
| Methylene chloride | 2.9 | mg/kg | |
| Naphthalene | 6.800 | mg/kg | |
| Pentachlorophenol | 8.2 | mg/kg | |
| Selenium | 0.36 | mg/kg | |
| Silver | 57.8 | mg/kg | TCLP .601 mg/l |
| Tetrachloroethene | 13 | mg/kg | |
| Toluene | 9.4 | mg/kg | |
| Trichloroethene | 6.5 | mg/kg | |
| Xylenes | 140 | mg/kg | |
| Asbestos | 100 | % | Asbestos will be packaged in accordance with federal and state requirements including 40 CFR 61, subpart M. |

This waste stream is Land Disposal Restricted (LDR) pursuant to 40 CFR due to leachable lead. The waste has been treated to its specified treatment standard.

Applicable LDR's: Waste Code: D008
 Subcategory: Radioactive Lead Solids
 Treatment Standard: Macro
 Sample Number: Waste is treated to a specified technology, sampling not applicable

or

Waste Code: D008
 Subcategory: Wastes that exhibit, or are expected to exhibit, the characteristic of toxicity for lead based on the toxicity characteristic leaching procedure (TCLP) in SW846.
 Treatment Standard: 5 mg/L
 Sample Number: To be sampled once treated.

Radiological Profile:

See attached waste designation.

By: [Signature]
Checked: [Signature]
Reviewed: [Signature]
Approved: [Signature]

Waste Stream Name: 300-FF-1 macroencapsulated lead and lead contaminated soil
Generating Facility: 618-4, Landfill 1A, Landfill 1B, Landfill 1D, and 300-44
Profile Number: 6184002 Revision 1
Prepared By: Richard Lipinski

The attached waste designation has been performed in accordance with WAC 173-303, 40 CFR 261, and 268 based on information provided by the generator. The designation is believed to be complete and accurate in accordance with all applicable rules and regulations in effect at the time it was prepared.

Characteristics:

Ignitability:

As this material is a solid matrix with no significant organic contamination the D001 code will not be applied.

Corrosive:

As a solid the waste cannot be a D002 waste, and there is no other data or process knowledge to support a corrosive solid classification, neither the D002 nor the WSC2 codes will be applied.

Reactivity:

As this material is a solid matrix from an outdoor location with no detectable cyanide contamination, the D003 code will not be applied. It is very improbable that any sulfide will be present at regulated levels after prolonged exposure to the elements. The waste is in a stable matrix, and exhibits no signs of any dangerous reactions (i.e., spontaneous changes).

Toxicity:

This waste is regulated for leachable lead. It will carry the D008 waste code. All other toxic compounds detected, except arsenic, barium, cadmium, chromium and mercury, were at levels less than 20 times the TCLP limit. TCLP results show they do not leach above regulatory limits, therefore no other codes D004-D043 were applied.

Toxic Dangerous Waste:

The toxic dangerous waste calculations were performed, and the waste does not meet the definition of a toxic dangerous waste.

Persistent Dangerous Waste:

PAHs are well below the regulatory limit. The HHs are above the regulatory limit due to the presence of PCB's being managed under TSCA, therefore the waste does not meet the definition of a persistent dangerous waste.

By: 2011-1-1
Checked: R. J. [Signature]
Reviewed: D. [Signature]
Approved: [Signature]

Listings:

F listing:

There is no analytical data, or process knowledge to support a F listing. Pentachlorophenol is present, but not as an unused formulation, therefore, the F027 code will not be applied.

K Listing:

The 618-4 site was used as a burial ground for 300 Area waste; it is not a K-listed process.

P/U Listing:

There is no analytical data, or process knowledge to support a P or U listing.

PCBs:

Selected items may contain PCBs up to 160 ppm which are TSCA regulated, therefore, the W001 code is not applied.

The remainder of the waste contains less than 50 ppm PCBs, and there is no process knowledge that would indicate it was generated as the result of a spill or leak from a material having an original concentration greater than 50 ppm, therefore, the waste is not regulated by TSCA for PCBs. PCB concentrations are > 2 ppm, however there is no process knowledge that would indicate the PCBs are a result of any electrical equipment, therefore, the W001 code is not applied.

Radiological:

The waste does not meet the definition of a TRU, High Level, 11e.(2) waste, spent nuclear fuel, or special nuclear material, and is therefore classified as a low level waste. This material contains uranium enriched at less than 1% by weight in the U-235 isotope. Sr-90 accounts for 0.0002% of the total activity.

This Profile exceeds the ERDF WAC for U-235 and U-238 as identified in Revision 2. Revision 2 was approved by ERDF pursuant to an "Environmental Restoration Disposal Facility Radiological Inventory Assessment Data Sheet" approved by A. R. Michael on 2/26/98.

NOTE:

Data from laboratory samples B01GP0, B01GP2, B01GP8, and B01GP9 are not included in this designation. Waste characterized by these samples is not allowed under this profile.

Sampling was not performed on 300-44, Landfill 1A and Landfill 1B but the results for the 618-4 Burial Grounds and Landfill 1D are expected to be conservative for these landfills.

TOXIC DANGEROUS WASTE CALCULATION

Species codes:

Fish (mg/L): a
 Oral Rat (mg/kg): b
 Inhalation Rat (mg/L): c
 Dermal Rabbit (mg/kg): d

Equivalent Concentration: X: B: D: 0.00E+00 5.00E-07 1.43E-04
 A: C: 3.54E-04 6.83E-04

Total EC: 0.00118115

Is waste toxic?

YES

Waste Code:

WT02

| Constituent | LD ₅₀ | Concentration (ppm) | Species | Toxic category |
|---------------------------------------|---------------------|---------------------|---------|----------------|
| 1,1,2-Trichloro-1,2,2-trifluoroethane | 43000 | 0.0085 | b | non-toxic |
| 1,1-Dichloroethene | 200 | 0.32 | b | C |
| 1,2-Dichloroethane | 670 | 0.38 | b | D |
| 1,2-Dichloroethene | 770 | 0.32 | b | D |
| 2-Methylnaphthalene | 1630 | 14000 | b | D |
| 4,4'-DDD | 113 | 0.3 | b | C |
| Acetone | 5800 | 12 | b | non-toxic |
| Aluminum | none | 112000 | | none |
| Ammonia | 1.39 | 0.5 | c | B |
| Antimony | 7000 | 29.9 | c | non-toxic |
| Aroclor 1254 | 1010 | 160 | b | D |
| Aroclor 1260 | 1315 | 0.22 | b | D |
| Arsenic | 763 | 130 | b | D |
| Barium | none | 45000 | | none |
| Benzene | 930 | 0.34 | b | D |
| Beryllium | none | 0.82 | | none |
| bis (2-Ethylhexyl) Phthalate | 25000 | 23 | d | non-toxic |
| Bromide | Not listed in NIOSH | 14.7 | | none |
| Butylbenzylphthalate | 2330 | 26 | b | D |
| Cadmium | 0.025 | 35.4 | c | A |
| Calcium | none | 18600 | | none |
| Carbon Tetrachloride | 2350 | 0.35 | b | D |
| Chloride | Not listed in NIOSH | 4480 | | none |
| Chlorobenzene | 1110 | 0.4 | d | C |
| Chloroform | 908 | 0.28 | d | C |
| Chromium | none | 1630 | | none |
| Cobalt | 6171 | 32.7 | b | non-toxic |
| Copper | none | 17000 | | none |
| Di-n-Butylphthalate | none | 0.48 | | none |
| Endosulfan I | 76 | 0.077 | b | C |
| Ethylbenzene | 3500 | 21 | b | D |
| Fluoranthene | 2000 | 0.1 | b | D |
| Fluoride | none | 71.7 | | none |
| Iron | 30000 | 31900 | b | non-toxic |
| Isoforone | 1500 | 31 | d | C |
| Lead | none | 1000000 | | none |
| Magnesium | none | 6940 | | none |
| Manganese | 9000 | 1510 | b | non-toxic |
| Mercury | none | 5.9 | | none |
| Methylene chloride | 1600 | 2.9 | b | D |
| Naphthalene | 490 | 6800 | b | C |
| Nickel | none | 570 | | none |

| Constituent | LD ₅₀ | Concentration (ppm) | Species | Toxic category |
|-------------------|---------------------|---------------------|---------|----------------|
| Nitrate | Not listed in NIOSH | 202 | | none |
| Nitrite | Not listed in NIOSH | 1 | | none |
| Pentachlorophenol | 27 | 8.2 | b | B |
| Phenanthrene | none | 1 | | none |
| Phosphate | Not listed in NIOSH | 5.4 | | none |
| Potassium | none | 1560 | | none |
| Selenium | 6700 | 0.36 | b | non-toxic |
| Silver | none | 57.8 | | none |
| Sodium | none | 202000 | | none |
| Sulfate | Not listed in NIOSH | 949 | | none |
| Tetrachloroethene | 2629 | 13 | b | D |
| Toluene | 636 | 9.4 | b | D |
| Trichloroethene | 5650 | 6.5 | b | non-toxic |
| Vanadium | none | 81 | | none |
| Xylenes | 4300 | 140 | b | D |
| Zinc | none | 3710 | | none |
| Zirconium | none | 400 | | none |

Persistent Dangerous Waste Calculation

Total HH:

0.01929755

Total PAH

0.00011

Is waste persistent?

Yes

Waste Code: WP02

Halogenated Hydrocarbons

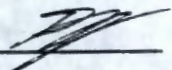
| | PPM | Conc. (%) | PAH | PPM | Conc. (%) |
|---------------------------------------|--------|------------|-------------------------|-----|-----------|
| 1,1,2-Trichloro-1,2,2-trifluoroethane | 0.0085 | 0.00000085 | Acenaphthene | | 0 |
| 1,1-Dichloroethene | 0.32 | 0.000032 | Acenaphthylene | | 0 |
| 1,2-Dichloroethane | 0.38 | 0.000038 | Anthracene | | 0 |
| 1,2-Dichloroethene | 0.32 | 0.000032 | Benzo(a)anthracene | | 0 |
| 4,4'-DDD | 0.3 | 0.00003 | Benzo(a)pyrene | | 0 |
| Aroclor 1254 | 160 | 0.016 | Benzo(b)fluoranthene | | 0 |
| Aroclor 1260 | 0.22 | 0.000022 | Benzo(g,h,i)perylene | | 0 |
| Carbon Tetrachloride | 0.35 | 0.000035 | Benzo(k)fluoranthene | | 0 |
| Chlorobenzene | 0.4 | 0.00004 | Chrysene | | 0 |
| Endosulfan I | 0.077 | 0.0000077 | Dibenz(a,h)anthracene | | 0 |
| Methylene chloride | 2.9 | 0.00029 | Dibenzo(a,j)acridine | | 0 |
| Pentachlorophenol | 8.2 | 0.00082 | Dibenzo(a,e)pyrene | | 0 |
| Tetrachloroethene | 13 | 0.0013 | Dibenzo(a,h)pyrene | | 0 |
| Trichloroethene | 6.5 | 0.00065 | Dibenzo(a,i)pyrene | | 0 |
| | | | Dibenzo(a,l)pyrene | | 0 |
| | | | Fluoranthene | 0.1 | 0.00001 |
| | | | Fluorene | | 0 |
| | | | Indeno(1,2,3-c,d)pyrene | | 0 |
| | | | Phenanthrene | 1 | 0.0001 |
| | | | Pyrene | | 0 |

TCLP Calculation

Number of hits: 1

| Constituent | TCLP result (ppm) | Total Result (ppm) | Converted total to TCLP | Limit (mg/l) | Waste Code |
|-------------------------|----------------------|-----------------------|-------------------------|-----------------|------------|
| Metals: | | | | | |
| Arsenic | 0.148 | 130 | 6.5 | 5.00 | D004 |
| Barium | 1170 | 45000 | 2250 | 100.00 | D005 |
| Cadmium | 0.623 | 35.4 | 1.77 | 1.00 | D006 |
| Chromium | 0.333 | 1630 | 81.5 | 5.00 | D007 |
| Lead | N/A | 1000000 | 50000 | 5.00 | D008 |
| Mercury | 0.0022 | 5.9 | 0.295 | 0.20 | D009 |
| Selenium | 0.0099 | 0.36 | 0.018 | 1.00 | D010 |
| Silver | 0.601 | 57.8 | 2.89 | 5.00 | D011 |
| Pest/Herb | | | | | |
| Chlordane | | | 0 | 0.03 | D020 |
| 2,4-D | | | 0 | 10.00 | D016 |
| Endrin | | | 0 | 0.02 | D012 |
| Heptachlor & Epoxide | | | 0 | 0.008 | D031 |
| Lindane | | | 0 | 0.40 | D013 |
| Methoxychlor | | | 0 | 10.00 | D014 |
| 2,4,5,-TP (Silvex) | | | 0 | 1.00 | D017 |
| Toxaphene | | | 0 | 0.50 | D015 |
| Organics | | | | | |
| Benzene | | 0.34 | 0.017 | 0.50 | D018 |
| Carbon Tetrachloride | | 0.35 | 0.0175 | 0.50 | D019 |
| Chlorobenzene | | 0.4 | 0.02 | 100.00 | D021 |
| Chloroform | | 0.28 | 0.014 | 6.00 | D022 |
| o-Cresol | | | 0 | 200.00 | D023 |
| m-Cresol | | | 0 | 200.00 | D024 |
| p-Cresol | | | 0 | 200.00 | D025 |
| total-Cresol | | | 0 | 200.00 | D026 |
| 1,4-Dichlorobenzene | | | 0 | 7.50 | D027 |
| 1,2-Dichloroethane | | 0.38 | 0.019 | 0.50 | D028 |
| 1,1-Dichloroethylene | | 0.32 | 0.016 | 0.70 | D029 |
| 2,4-Dinitrotoluene | | | 0 | 0.13 | D030 |
| Hexachlorobenzene | | | 0 | 0.13 | D032 |
| Hexachlorobutadiene | | | 0 | 0.50 | D033 |
| Hexachloroethane | | | 0 | 3.00 | D034 |
| Methyl ethyl Ketone | | | 0 | 200.00 | D035 |
| Nitrobenzene | | | 0 | 2.00 | D036 |
| Pentachlorophenol | | 8.2 | 0.41 | 100.00 | D037 |
| Pyridine | | | 0 | 5.00 | D038 |
| Tetrachloroethylene | | 13 | 0.65 | 0.70 | D039 |
| Trichloroethylene | | 6.5 | 0.325 | 0.50 | D040 |
| 2,4,5 Trichlorophenol | | | 0 | 400.00 | D041 |
| 2,4,6 Trichlorophenol | | | 0 | 2.00 | D042 |
| Vinyl chloride | | | 0 | 0.20 | D043 |

| Isotope | Limit (Ci/m ³) | Max Conc. (pCi/g) | Max Conc. (Ci/m ³) | Avg. Conc. (pCi/g) | Avg. Conc. (Ci/m ³) | Ratio to Limit | Ratio x 2 | Max Conc. x 2 |
|---------|-------------------------------|----------------------|-----------------------------------|-----------------------|------------------------------------|-------------------|--------------|------------------|
| Ac-227 | 7.50E+04 | | | | | | | |
| Am-241 | 5.00E-02 | | | | | | | |
| Am-242m | Not Listed | | | | | | | |
| Am-243 | 5.70E-02 | | | | | | | |
| Be-7 | Not Listed | | | | | | | |
| C-14 | 5.30E+00 | | | | | | | |
| C-14* | 5.30E+01 | | | | | | | |
| Cs-134 | NL | | | | | | | |
| Cs-135 | 8.80E+00 | | | | | | | |
| Cs-137 | 3.20E+01 | 1.17E-01 | 1.87E-07 | | | 5.85E-09 | 1.17E-08 | 3.74E-07 |
| Cl-36 | 3.50E-02 | | | | | | | |
| Cr-51 | Not Listed | | | | | | | |
| Co-58 | Not Listed | | | | | | | |
| Co-60 | NL | 7.70E+00 | 1.23E-05 | | | NA | NA | 2.46E-05 |
| Cm-242 | 2.00E+04 | | | | | | | |
| Cm-243 | 8.50E+01 | | | | | | | |
| Cm-244 | 4.00E+01 | | | | | | | |
| Cm-245 | 5.50E-02 | | | | | | | |
| Cm-246 | 1.10E-01 | | | | | | | |
| Cm-247 | 3.00E-02 | | | | | | | |
| Cm-248 | 2.80E-02 | | | | | | | |
| Eu-150 | 1.70E+02 | | | | | | | |
| Eu-152 | 2.10E+07 | | | | | | | |
| Eu-154 | NL | | | | | | | |
| Eu-155 | Not Listed | | | | | | | |
| H-3 | NL | | | | | | | |
| I-129 | 8.00E-02 | | | | | | | |
| Pb-210 | 5.30E+05 | | | | | | | |
| Mo-93 | 5.00E+01 | | | | | | | |
| Np-237 | 1.50E-03 | | | | | | | |
| Ni-59 | 2.10E+02 | | | | | | | |
| Ni-59* | 2.20E+02 | | | | | | | |
| Ni-63 | 7.00E+02 | | | | | | | |
| Ni-63* | 7.00E+03 | | | | | | | |
| Nb-94 | 1.20E-02 | | | | | | | |
| Nb-94* | 1.20E-01 | | | | | | | |
| Pd-107 | 8.30E+02 | | | | | | | |
| Pu-238 | 1.50E+00 | | | | | | | |
| Pu-239 | 2.90E-02 | | | | | | | |
| Pu-240 | 2.90E-02 | | | | | | | |
| Pu-241 | 6.20E+00 | | | | | | | |
| Pu-244 | 3.30E-02 | | | | | | | |
| K-40 | 9.50E-02 | | | | | | | |
| Ra-226 | 1.40E-04 | | | | | | | |
| Ra-228 | 2.20E-04 | | | | | | | |
| Na-22 | Not Listed | | | | | | | |
| Sm-147 | 9.30E-01 | | | | | | | |
| Sm-151 | 5.30E+04 | | | | | | | |
| Se-79 | 2.80E+01 | | | | | | | |
| Sr-90 | 7.00E+03 | 2.00E-01 | 3.20E-07 | | | 4.57E-11 | 9.14E-11 | 6.40E-07 |
| Tc-99 | 1.30E+00 | | | | | | | |
| Th-228 | 1.20E-04 | | | | | | | |
| Th-232 | 6.00E-03 | | | | | | | |



| | | | | | | | |
|-----------|----------|----------|----------|----------|----------|----------|----------|
| Sn-126 | 8.50E-03 | | | | | | |
| U-233/234 | 7.40E-02 | | | | | | |
| U-235 | 2.70E-03 | 5.70E+03 | 9.12E-03 | | 3.38E+00 | 6.76E+00 | 1.82E-02 |
| U-238 | 1.20E-02 | 1.20E+05 | 1.92E-01 | | 1.60E+01 | 3.20E+01 | 3.84E-01 |
| Zr-93 | 1.40E+02 | | | | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Totals: | | 1.26E+05 | 2.01E-01 | 0.00E+00 | 0.00E+00 | 1.94E+01 | 3.88E+01 |

NRC Classification: Class A

Other Isotopes present:

Radiological considerations:

The following isotopes are found in the waste but considered to be naturally occurring and are therefore not reported: K-40, Th-228, Th-232

The following isotopes are found in the waste but are decay products of reported radionuclides and are therefore not reported: Ra-226, U-234

*these entries are for isotopes present as activated metals

Work Plan for Acceptance of Elevated Radionuclide Concentration Waste

Purpose: The "Safety Analysis for the Environmental Restoration Disposal Facility" (BHI-00370, Rev 3) established limits for radionuclide concentrations acceptable at ERDF. This limit is based on a 24-hour average. Therefore, waste exceeding these limits can be accepted at ERDF as long as the 24-hour average does not exceed these limits. When waste is received above the limit, it will be processed with waste that is less than the limit. This action will ensure that the 24-hour average for the limit is not exceeded.

Scope: This work plan applies only to waste that is above the concentration limits established in BHI-00370, Rev.3, Table 1-1, Column 4.¹

Requirements:

- 1.0 If the radionuclide listed on the Onsite Waste Tracking Form is above the concentration limits established in BHI-00370, Rev. 3, Table 1-1, Column 4, then the shipper of the waste shall perform the following activities prior to the shipment of the waste to ERDF.
 - 1.1. Notify the ERDF Waste Acceptance Manager at least 24-hours in advance that an over limit shipment will be sent to ERDF.
 - 1.2. Place a marking on the front right-hand side of the shipping box stating the following: "Elevated Radionuclide Concentration Waste, Do Not Unload Without Waste Acceptance Manager Approval."
 - 1.3. If individual containers are sent to the ERDF, the containers shall be marked with the following statement: "Elevated Radionuclide Concentration Waste, Do Not Unload Without Waste Acceptance Manager Approval."
- 2.0 The ERDF Waste Acceptance Manager will ensure that the 24-hour average is not exceeded by processing waste loads of lesser activity with waste that exceeds the concentration limit.
 - 2.1. The Waste Acceptance Manager will announce during the morning briefing that waste will be received that exceeds the concentration limits and that the waste must be processed with other waste. ERDF shuttle truck drivers will be instructed not to pick up the waste until given permission to do so by the Waste Acceptance Manager.
 - 2.2. The ERDF Waste Acceptance Manager will complete a set of calculations demonstrating that the 24-hour average has not been exceeded.

¹ Footnote: Reference: RFS-ERDF-002.10 (A), Rev. 3, 1/28/97 Waste Acceptance Procedure Section 6.0

Author: Michael A (Mike) Casbon at -BHI013

Date: 8/5/98 12:47 PM

Priority: Normal

TO: Daniel G Saucedo at -BHI019

TO: Richard L Weiss at -BHI012

CC: Benjamin P (Ben) Moyers at -BHI019

CC: Gregory B Mitchem at -BHI008

CC: ^ERC Document Info Service at -BHI008

Subject: ERDF Liner/Chemical Compatibility

----- Message Contents -----

This message is intended to confirm the phone conversation held yesterday (8/4/98) regarding the interpretation of chemicals listed in appendix J of BHI-00359, rev. 00, Evaluation of Liner/Leachate Chemical Compatibility for the ERDF. For the purposes of chemical compatibility with HDPE liners variants of compounds shown in Appendix J are the same as the chemicals listed. For example, 1,1,1 Trichloroethylene is the same as Trichloroethylene in its effects on HDPE.

Please reply to this message with any changes you feel are necessary.

Thank you,

MAC

Author: Jeff R James at -BHI012
Date: 4/7/98 2:55 PM
Priority: Normal
TO: David R Einan at -HANFORD02A
TO: Robert G (Bob) McLeod at -EXCHANGE
CC: Paul J Berthelot at -BHI019
CC: Richard A Carlson
CC: Jeffrey A Lerch at -BHI009
CC: Bradley D Schilperoort at -BHI015
CC: R W (Randy) Jackson at -BHI015
CC: Douglas L Bowers at -BHI001
CC: Vernon R (Vern) Dronen at -BHI002
Subject: 618-4 Sampling Program

----- Message Contents -----

Dave:

Based on our discussion today, here is how we plan to address potential lead contamination in the 618-4 Burial Ground.

- Excavate all waste soils/debris into stockpiles before shipping.
- Take at least three samples from each stockpile
- Run XRF analysis on each sample at our on-site lab
- If all lead results are below 100 mg/kg: Ship to ERDF
- If any lead results are above 100 mg/kg: Send the remainder of the sample with the highest XRF lead concentration to an off-site lab for TCLP analysis
- If the TCLP result is below 5 mg/l: Ship to ERDF
- If the TCLP result is above 5 mg/l: Isolate the stockpile until additional characterization/treatment options are discussed with EPA.

I have instructed our team to proceed on this basis. Please contact me if you have any comments or questions.

Jeff

ENVIRONMENTAL RESTORATION DISPOSAL FACILITY RADIOLOGICAL INVENTORY ASSESSMENT DATA SHEET

PART A

Preparers Name: Mike Carlson MSIN: T2-05
 Organization Name: ERDF
 Technical Contact: _____ Phone: 373-7328
 Waste Site ID: 300EE-1 Profile 61840012 OU: ERDF

Description of Issue: U-238, U-235 and Sum of Fractions for this profile exceed ERDF WAC. Calculations for this worksheet (see attached) show that a limited amount of this material, as estimated by Rich Carlson (see attached), is not exceed the ERDF WAC for total inventory.

PART B

Calculation of Integrated Inventory Concentration (IIC)

| | | U-238 | U-235 | |
|--|-------------------|--------------------------------------|--------------------------|---|
| | | COC ₁ | COC ₂ | COC ₃ |
| ERDF WAC Limit [WAC] | Ci/m ³ | | | |
| Current ERDF Inventory [I ₀] | Ci | | | |
| Current ERDF Total Volume [V ₀] | m ³ | | <u>attached</u> | |
| Proposed Waste Site Inventory Addition [I ₁] | Ci | <u>see</u> | | |
| Proposed Waste Site Volume Addition [V ₁] | m ³ | <u>see</u> | | |
| Calculation: | | | | |
| Integrated Inventory Concentration = IIC = $\frac{I_0 + I_1}{V_0 + V_1}$ | | | | |
| Calculated IIC less than the WAC? (Circle correct answer) | | <input checked="" type="radio"/> Yes | <input type="radio"/> No | <input checked="" type="radio"/> Yes <input type="radio"/> No |

Proposed Site Inventory Volume Addition is Acceptable for Shipment to ERDF

Michael
 ERDF Project Engineer

2/26/98
 Date

DOE Operable Unit Manager
 EPA Operable Unit Manager
 Dept. of Ecology Operable Unit Manager

DOE ERDF Project Manager Owen Robertson
 EPA ERDF Project Manager Ann Innis
 Dept. of Ecology ER Team Leader Glenn H. Fisher

ERDF Radiological Inventory Assessment Calculation Sheet

Michael Casbon 2/25/98

Profile # WP-6184001, Rev. 02

Purpose: Calculate Sum of the Fractions for U-238 contained in profile 6184001, rev. 02. Note that this calculation applies the maximum concentration over the entire volume of the profile, making this an extremely conservative calculation.

Constituent of Concern

U-238

U-235

ERDF WAC Limit (C.) Ci/m3

1.20E-02

2.70E-03

Current ERDF Inventory (I.) Ci

5.37E+00

6.10E-02

Current ERDF Total Volume (V.) m3 (see calculation below)

290419

290419

Proposed Waste Site Inventory Addition (I.) Ci

1.47E+02

6.98E+00

Proposed Waste Site Volume Addition (V.) m3

765

765

(please see note)

Calculation for integrated Inventory Concentration (C.) =

 $I + I/V_i + V_i$

5.23E-04

2.42E-05

Limit to Actual Ratio C./C.

0.043571

0.008952

Sum of the Fractions

0.052522

* ERDF Volume Calculation (as of 1/31/98) =

733.497.5 tons x .765 m3/yd3/1.931T/yd3 =

290419 m3

U-238 Ci = 765 m3 x 1.92E-01 Ci/m3 =

146.88

Ci

U-235 Ci = 765 m3 x 9.12E-03 Ci/m3

6.98

Ci

Proposed waste site inventory addition is estimated to be 1000 yd3 by Rich Carlson (see attached cc:mail). This equal

765 m3

Author: Michael A (Mike) Casbon at -BHI013
Date: 5/6/98 1:28 PM
Priority: Normal
TO: Daniel G Saucedo at -BHI019
CC: ^BHI Document & Info Services at -BHI012
CC: Jeffrey C Biagini at -BHI017
CC: Pamela S Innis at -HANFORD02A
CC: Jeffrey A Lerch at -BHI009
CC: Ashur R Michael at -BHI002
CC: Benjamin P (Ben) Moyers at -BHI019
CC: Frederick V Roeck at -BHI003
CC: Bradley D Schilperoort at -BHI015
CC: Barry L Vedder at -BHI003
CC: Richard L Weiss at -BHI012
Subject: Non-WAC Chemicals -WP 6184001 Rev.05

----- Message Contents -----

Daniel,

The four non-WAC chemicals have the manufacturer's limits shown below. These limits represent leachate concentrations, not soil concentrations. The chemical's concentration in the waste stream cannot reasonably be expected to cause the ERDF leachate to exceed any of the limits. Therefore, these chemicals do not threaten the ERDF liner and may be accepted at the ERDF.

The over-WAC chemicals listed below, Napthalene and Xylenes, each have manufacturer's limits ranging from 200-10,000 ppm. The approximate calculated leachate concentrations for these two chemicals at the concentrations shown on the profile are 1,000 ppm and 500 ppm respectively. While these are within the range of manufacturer's limits the impact on the liner integrity will be negligible for the following reasons: Concentrations shown on the profile represent the highest concentrations detected in all samples, and the total waste under this profile is slightly over 20,000 m3 (27,000 yd3). In comparison, the ERDF currently holds approximately 350,000 m3 (460,000 yd3) of waste. The actual leachate concentrations of these two chemicals, when combined with the leachate from the surrounding waste will not endanger the ERDF liner.

-----Original Message-----

From: Daniel G Saucedo
Sent: Monday, May 04, 1998 2:13 PM
To: Michael A (Mike) Casbon
Subject: 6184001 Rev.05

Mike,

Profile 6184001, Rev.05, has added 12 new chemical constituents then previously reported in Rev.04, making a total of 37 constituents. Of the 37 chemicals eight are Non-WAC chemicals, in this revision four of the eight have not been approved for liner integrity:

| | | CAS# | Manufacturer's limits |
|--------------------|-------------|----------|-----------------------|
| 1,1-Dichloroethene | 0.32 mg/kg | 75-35-4 | 100-2000 ppm |
| 1,2-Dichloroethane | 0.38 mg/kg | 75-34-3 | 100-2000 ppm |
| Chlorobenzene | 0.4 mg/kg | 108-90-7 | 50-2000 ppm |
| Endosulfan I | 0.077 mg/kg | 959-98-8 | 100-2000 ppm |

Of the 29 WAC approved chemicals two of them are above WAC limits:

Naphthalene is listed in Rev.05, at 6,800 mg/kg and the WAC has a limiting factor of 1,407 mg/kg [a].

Xylenes is listed in Rev.05, at 140 mg/kg and the WAC has a limiting factor of 64 mg/kg [a].

* [a] in the WAC indicates a footnote of "Liner protection is limiting (BHI 1995d)".

Rad concentration for Rev.05, has remained the same as Rev.04. I will await your response prior to my final approval.

Thanks,
Daniel



JOB DESCRIPTION

| |
|--|
| TITLE |
| SENIOR ARCHITECTURAL SPECIALIST |
| REPORTS TO |
| CHIEF ARCHITECT/ENGINEERING SUPERVISOR/ ENGINEERING MANAGER |
| ORGANIZATION |
| ENGINEERING OFFICE ENGINEERING |

| | |
|----------------------------|---------------|
| CODE NUMBER | OVERTIME CODE |
| 112A | EST |
| APPROVED SALARY GRADE | |
| 27 | |
| EFFECTIVE DATE | |
| April 1, 1992 | |
| REPLACES DESCRIPTION DATED | |
| July 5, 1980 | |

SUMMARY:

Applies intensive and diversified knowledge of architectural principles and sound knowledge of engineering practices in staff work. Independently makes decisions on architectural problems and methods, and resolves special technical questions. Uses advanced architectural techniques and modifies and extends theories, precepts and practices of related sciences and disciplines.

JOB DIMENSIONS:

A. Supervision Received

- Receives operational supervision and technical assignments from the Chief Architect or Engineering Supervisor. Objectives are defined; consults with supervisor on unusual aspects or developments.

B. Supervision Exercised

- Does not normally supervise but provides technical guidance to architects, engineers or technicians as required.

C. Contacts

- Maintains contacts with project engineers, suppliers and appropriate field personnel to ensure that architectural requirements and controls are consistent with Bechtel policies, procedures and standards.
- Maintains relationships as delegated with outside consultants.

PRINCIPAL RESPONSIBILITIES:

1. Develops and evaluates architectural plans and design criteria for a variety of projects and activities.
2. Interprets new or special regulations, codes, standards, criteria and performance data.
3. Conducts or leads special studies of new architectural methods, materials and techniques.
4. Develops conceptual designs for architectural projects or projects having specialized or unique architectural requirements.
5. Provides technical advice and counsel on specific assignments.
6. Provides input to and participates in special technical educational and training programs as directed.

JOB KNOWLEDGE:

Technical knowledge of architectural concepts, techniques, material characteristics and construction methods.

An extensive knowledge of precedents in a specialty area and a broad knowledge of principles and practices of related engineering methods and systems.

A broad knowledge of industry or regulatory standards and design criteria pertinent to architectural work. Skill in oral and written communication.

TITLE

SENIOR ARCHITECTURAL SPECIALIST

APPROVED SALARY GRADE

27

The above is normally acquired through:

- A license to practice architecture from a recognized licensing board,

OR

- A recognized degree in architecture from an accredited college or university,

OR

- Specialized courses in architectural design, planning, materials engineering, construction methods or related engineering and design,

AND

- Broad progressive work experience to the degree necessary to perform the responsibilities outlined above. This practical work experience must be primarily in architecture, but may be supplemented by relevant experience in related phases of the building industry.